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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/661,035	09/13/2000	Tomohide Terashima	49657-801	8222
7590 08/05/2004			EXAMINER	
McDermott Will & Emery			LOKE, STEVEN HO YIN	
600 13th Street NW			ART UNIT	PAPER NUMBER
Washington, DC 20005-3096			2811	

DATE MAILED: 08/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/661,035

Applicant(s)

TERASHIMA, TOMOHIDE

Examiner

Steven Loke

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 January 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 7-9 and 13 is/are allowed.
- 6) ☒ Claim(s) 1-6, 10-12, 14-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

1. Claims 1-6, 12 and 14-18 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Figs. 14 and 15 disclose a position of an interface between the first region [2] and the fourth region [7] in a depth direction changes for **a cross section** crossing the region along a direction substantially orthogonal to the direction of the current flow. However, the specification never discloses the position of the interface between the first region and the fourth region in the depth direction changes for **any cross sections** crossing the region along a direction substantially orthogonal to the direction of the current flow as claimed in claims 1 and 5.

The specification (page 23, line 33 to page 24, line 4) discloses the ninth embodiment may employ a P-type diffusion region, which is continuously formed in the direction crossing the direction of the current flow, and has a variable depth. However, the specification never discloses a position of an interface between the first region and the fourth region in a depth direction changes for any cross sections crossing a region in which the interface exists along a direction of flow of the current as claimed in claim 2. The specification also never discloses the position of the interface between the first region and the fourth region in the depth direction changes for **any cross sections** crossing the region along a direction substantially orthogonal to the direction of the current flow as claimed in claim 2.

The specification never discloses the device also comprises a plurality of fourth regions spaced from each other by a distance allowing connection between depletion layers extending from the neighboring fourth regions, respectively, in an on state as claimed in claim 5.

Fig. 26 discloses a bipolar transistor having a p-type third region [5] is in contact with the p-type fourth region [7]. The specification never discloses the fourth region is spaced apart from the third region as claimed in claims 17 and 18.

2. Claims 1, 3-6, 10-12, 14-16 and 18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, line 21; claim 5, line 24, the phrase "a sixth region" is unclear as to where is the fifth region in claims 1 and 5.

Claim 10 discloses a single continuous fourth region of the first conductivity type having a depth changing as a position moves in a direction crossing of flow of the current. However, it is unclear how a plurality of discretely formed regions are able to have a depth changing as a position moves in a direction crossing a direction of flow of the current.

3. Applicant's arguments filed 1/26/04 have been fully considered but they are not persuasive.

It is urged, in page 11 of the remarks, that Figures 1-3 and 17, and page 10, lines 1-4 of the specification clearly teach a plurality of fourth regions spaced from each other by a distance allowing connection between depletion layers extending from the

neighboring fourth regions in an on state. However, it is important to note that one embodiment of the invention (the second embodiment (figs. 14 and 15 and page 23, line 33 to page 24, line 4)) is directed to a continuous p-type region [7] and the other embodiment of the invention (the first embodiment (figs. 1-3)) discloses a plurality of fourth regions [7] formed in the substrate [2]. Since the specification never discloses the second embodiment can be combined with the first embodiment, the specification never discloses the subject matters as claimed in claim 5.

It is urged, in page 12 of the remarks, that the specification clearly discloses a plurality of discretely formed regions having a depth changing as a position moves in a direction crossing the flow of current. However, as mentioned in the previous paragraph, only a continuous p-type region [7] (figs. 14-15) having a depth changing as a position moves in a direction crossing a direction of flow of the current. The plurality of discretely formed regions [7] (figs. 1-3) cannot have a depth changing as a position moves in a direction crossing a direction of flow of the current. Each of the discretely formed regions [7] has a flat bottom surface in a direction crossing a direction of flow of the current.

4. Claims 7-9 and 13 are allowed.

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not

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mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven Loke whose telephone number is (571) 272-1657. The examiner can normally be reached on 7:50 am to 5:20 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (571) 272-1732. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

sl
July 30, 2004

Steven Loke
Primary Examiner
